huge "factory" school, found so often in our large towns, and would limit the enrolment so that no school should accommodate more than 600 pupils.

These reforms, it is declared, would tend not only to the efficiency of education, but also to the betterment of the teacher's position as regards both emoluments and social status. But the fallacy underlying a large number of the propositions laid down in a more or less arbitrary manner (for there is little or no attempt made to adduce reasons for the changes advocated) is that education may be improved by a mere extension of time. Education is at present compulsory in Scotland until fourteen years of age, and even then a considerable percentage of the children in attendance fail to attain any satisfactory standard in the "three R's." Extend this by one year, and all will be well. It seems never to have occurred to the committee that a change in the methods of elementary education might bring about better results than the present, even at the earlier age. The object of education is to supply the child with ideas which shall be instrumental in after life, and these instruments can be intelligently and efficiently used just in so far as the child understands not only the instrument, but also the principles upon which it has been constructed.

Now, few teachers realise the instrumental character of ideas, or that the activity of knowing arises either to satisfy a need or to meet a new situation, and that the failure of education is due largely to the neglect of these considerations. To take an example: If the continuation school, on the technical side, is to achieve its object, it must provide opportunities for the meeting and solving of the real situations and problems of the workshop. If this is borne in mind, then it must be obvious that continuation schools can be instrumental in solving only a limited number of the real problems which arise in life, and that in many cases a boy or girl will obtain the best technical education in learning how to meet the situations which arise from real work. The boy, *e.g.*, whose desire is to become a fisherman will obtain the best training by his daily work, and will benefit little by being compelled to attend a continuation school until eighteen years of age. Rather, he will probably waste his time, and so render himself less fit for his daily avocation; and if we go on, we shall come to other exceptions, and find that, like all general rules, the particular principle that all boys and girls should be compelled to attend some kind of school until eighteen is too wide to be of any practical value in solving the real problems of life and of education.

A somewhat similar fallacy arises from the demand made for more science teaching in schools. Because science deals with realities in contrast to the humanities which are said to deal only with ideas, therefore education in science will be real because it deals with realities. But real problems, real situations, are often absent in the teaching of science in schools. A boy learning chemistry may throughout deal with realities, and yet never be called upon during his course to solve a real problem, since for him the need never arises. Generally we must ever keep in mind that education is taking place only when our pupil is "thinking"; that thinking arises only when there is some problem to solve, some new situation to meet, or some obstacle to remove; and that when these conditions are absent all instruction becomes, and must become, mere unintelligent memorising, which develops neither the intellectual powers nor the ability to meet the after demands of life.

In conclusion, the one reform needed at present is to form a clear idea of what education really is—to understand that it takes place only when our pupils are being trained to think out solutions to real problems, or to devise means to meet real situations. Thereafter we may fruitfully discuss the agencies best fitted to attain this end, and, as a consequence, we may be less chary of believing that a new earth is to be attained by the extension of the leaving-school age and by the compulsory school education of all until eighteen. We may even doubt whether "compulsory" education is education at all.

A. D.

NOTES.

THE death is announced, at seventy-three years of age, of Prof. A. J. F. Dastre, director of the laboratory of animal physiology at the Sorbonne, and a member of the Paris Academy of Sciences.

WE regret to see the announcement of the death on October 18, in his eighty-ninth year, of Prof. Edward Hull, F.R.S., late Director of the Geological Survey of Ireland, and professor of geology in the Royal College of Science, Dublin.

MR. W. B. WORTHINGTON, who was elected president of the Institution of Civil Engineers at the last annual general meeting, has resigned the position from reasons of health, and Mr. H. E. Jones, a vice-president, has been nominated president for the year 1917–18.

AT a meeting of the Royal College of Physicians of London, held on Thursday, October 18, the Baly medal, for physiological work, was presented to Prof. W. M. Bayliss, and the Bisset-Hawkins medal was given to Sir Arthur Newsholme, in recognition of his efforts for the advancement of sanitary science.

THE death is announced of Sir John Prichard-Jones, Bart., principal of the firm of Messrs. Dickins and Jones, the London drapers. He took an active interest in higher education in Wales; he was treasurer of the Welsh National Museum, and a member of the council of the North Wales University College, Bangor, of which he was senior vice-president from 1909 to 1913. The University of Wales conferred upon him the degree of LL.D.

ON the occasion of the recent Glasgow meeting of the Refractory Materials Section of the Ceramic Society, the council appointed two sub-committees (with power to co-opt additional members) to prepare reports respectively on (1) standardisation of methods of testing, (2) refractories for spelter furnaces. It is anticipated that the former will be ready for the spring meeting in Sheffield, and the latter for the following autumn meeting at Cardiff.

WE learn from the *Times* that Mr. Walter Long has appointed Sir Boverton Redwood, Bart., Director of Technical Investigations in the recently created

Petroleum Executive, with the view of his dealing with technical questions of the highest importance, including the co-ordination of the work of petroleum production and that of petroleum research. In order to devote himself to his new duties Sir Boverton Redwood will cease to act as Director of Petroleum Research.

IN answer to a question asked in the House of Commons on October 18 the Chancellor of the Exchequer said:—"The proposal of a Ministry of Health is under careful consideration; at present the various difficulties needing to be provided for in the establishment of such a Ministry have not reached any widely agreed solution, and so long as this is so it is not possible to undertake to introduce a Bill for the purpose. Steps are, however, being taken which will, it is hoped, secure substantial agreement amongst those who are actively engaged in the work of national health."

THE *Times* of October 24 announces the death of Surgeon-General Sir Charles Pardey Lukis, K.C.S.I., Director-General of Indian Medical Services, at sixty years of age. Sir Charles received his professional education at St. Bartholomew's Hospital, and entered the Indian Medical Service in 1880. In 1905 he was appointed principal and professor of medicine in the Calcutta Medical College, and was selected to be Director-General at the beginning of 1910. He took especial interest in original research in medicine in India, and edited a journal devoted to this subject, as well as two or three well-known tropical medical text-books; he was also the author of "A Manual of Tropical Hygiene."

AT the annual statutory meeting of the Royal Society of Edinburgh, held on October 22, the following office-bearers and members of council were elected:—*President,* Dr. J. Horne; *Vice-Presidents,* the Right Hon. Sir J. H. A. Macdonald, Prof. R. A. Sampson, Prof. D'Arcy Thompson, Prof. J. Walker, Prof. G. A. Gibson, and Dr. R. Kidston; *General Secretary,* Dr. C. G. Knott; *Secretaries to Ordinary Meetings,* Prof. A. Robinson and Prof. E. T. Whittaker; *Treasurer,* Mr. J. Currie; *Curator of Library and Museum,* Dr. A. C. Mitchell; *Councillors,* Dr. J. H. Ashworth, Prof. C. G. Barkla, Prof. C. R. Marshall, Dr. J. S. Black, Sir G. A. Berry, Dr. J. S. Flett, Prof. M. Maclean, Prof. D. Waterston, Prof. F. O. Bower, Prof. P. T. Herring, Prof. T. J. Jehu, and Dr. A. Lauder.

THE series of meetings arranged by the director of the Meteorological Office since 1905 for the informal discussion of important contributions to meteorological literature, particularly those by Colonial or foreign meteorologists, was reopened on Monday, October 22, at 5 o'clock, and will be continued until March next. Among the subjects to be considered are:—The distribution of cyclonic rainfall in Japan; the Aurora Borealis expedition of 1913 to Bossekop, Norway; the height of the Aurora Borealis; monthly mean temperatures of the surface water in the Atlantic north of lat. 50° N.; (1) types of storms in the United States and their average movements, (2) types of anticyclones; the properties of revolving fluid; meteorology of Norway; and aerography.

DR. ROBERT BRAITHWAITE, whose death on October 20, in his ninety-fourth year, is announced, was a fellow of the Linnean and Royal Microscopical Societies, as well as of several foreign natural history societies. He entered the medical profession in 1858, and became M.D. of St. Andrews in 1865. His three elaborate volumes on "The British Moss-Flora," of which the publication was completed in 1905, constitute the standard work upon their subject. All the 128 pages of plates which illustrate this work were engraved from drawings made by the author himself, and the whole work forms a remarkable monument of his skill and industry. The Sphagnaceæ were not included in the volumes, but Dr. Braithwaite published an interesting monograph upon these, namely, "The Sphagnaceæ, or Peat Mosses of Europe and North America."

THE Minister of Munitions has issued an order that no person shall deal in potassium compounds except under a licence issued by the Controller of Potash Production. No licence will be required (*a*) by the Admiralty or War Office; or (*b*) by any person for the purchase of potassium compounds in quantities not exceeding 3 lb. in any one calendar month. All persons must furnish returns to the Controller of Potash Production of all potassium compounds under their control, manufactured, or dealt in by them. The potassium compounds to which the order relates are the hydrate, chloride, carbonate, and sulphate, whether in a pure or in a commercial form, and any material (other than blast-furnace dust referred to in the order of the Minister of Munitions of August 7, 1917) of which more than 10 per cent. consists of any one or more of the above.

A MEETING is to be held at the Manchester School of Technology in the afternoon of Saturday, November 10, under the chairmanship of Dr. Alfred Rée, for the purpose of inaugurating a British Association of Chemists. The objects of the proposed association are "(*a*) to obtain power to act as sole registration authority for all chemists; (*b*) to have the word chemist legally redefined; (*c*) to safeguard the public by obtaining legislation ensuring that certain prescribed chemical operations be under the direct control of a chemist; and (*d*) to raise the profession of the chemist to its proper position among the other learned professions, so that it may attract the attention of a larger proportion of the best intellects, and thereby secure a supply of highly trained chemists adequate to the industrial needs of the country." The meeting is open to all chemists. The hon. secretary of the Provisional Committee is Mr. R. E. Crowther, 3 Langford Road, Heaton Chapel, near Stockport.

A PRIVATE letter from Dr. Paul Bertrand announces the death of his father, Prof. C. E. Bertrand, the distinguished plant-anatomist and palæobotanist. Among recent plants Prof. Bertrand elucidated the structure of Gnetaceæ and Conifereæ (1874), of Tmesipteris (1881), and of Phylloglossum (1882), and in 1902 published, in conjunction with Prof. Cornaille, a remarkable theory of the construction of the vascular strands of the ferns and other plants. In fossil botany he investigated the problematical fossil Algæ of the Boghead Coal (1892–94), worked out the detailed structure of the famous *Lepidodendron Harcourtii* (1891), discovered the minute Carboniferous Lycopod, Miadesmia (1891), and described one of the first examples of a ribbed Sigillaria, with structure preserved. Perhaps his most important palæobotanical work was his researches, in collaboration with Renault, on the Poroxylons, a most elaborate study of a remarkable group. His latest papers were on the comparative structure of various Palæozoic seeds (1907–11). He also wrote on the formation of coal and on the Iguanodon coprolites of Bernissart. His work was characterised by the most careful accuracy and an almost mathematical precision. Bertrand was professor of botany at Lille, and lived there for the last three years of his life under German rule. Under these difficult and painful conditions, he was still able to carry on both his university courses and his private research, as long as his health permitted. His death took place in August, but the sad news only reached his son this month.

MR. W. THOMSON, in his presidential address to the Manchester Literary and Philosophical Society on October 2, gave a sketch of the very important work which had been done by the society since its inauguration in 1781, as a continuation of the Warrington Academy, which was established twenty-four years earlier (1757), in which it is believed that Marat, the great French revolutionist, taught languages. Joseph Priestley, the discoverer of oxygen in 1774, was teacher of languages and *belles lettres* at that academy in 1761. Later, whilst at Warrington, he began the study of science, and was afterwards a member of the society. Both Dalton and Joule were closely connected with the society: the former had his laboratory in the present society's rooms. He was elected a member in 1794, and was president from 1817 until 1844. During the last 136 years most of the eminent scientific men of Manchester have been members of this society, and have contributed to its memoirs. Dr. Henry Wilde, with others, subscribed handsomely to the extension of the present premises in 1883, and then bequeathed to it an endowment of 8265*l.*, the interest of which is at present employed for the purposes of the society. The members of to-day include the most eminent men of science in Manchester, and there are at present about 150 members. Since the war commenced the value of scientific knowledge has been more highly appreciated in England than ever before, and it is to be hoped that manufacturers and others in Manchester will show their appreciation of science by joining the society.

WE regret to announce the death on October 18 of Mr. George Charles Crick, assistant in the geological department of the British Museum. Mr. Crick was born at Bedford on October 9, 1856, and received his scientific education at the Royal School of Mines, of which he was an associate. He was appointed to the staff of the British Museum in 1886, and devoted himself to the care and special study of the fossil Cephalopod Mollusca. Though he had been in failing health for some years he continued to attend to his museum duties until the end, and on the day before his death he was able to discuss with Dr. Kitson the geological age of some new ammonites from Nigeria. His knowledge of the fossil Cephalopoda was, indeed, so profound that his services were in constant request by geologists investigating new countries, and his published writings, though numerous, give only an imperfect idea of the extent of his researches and their importance for the progress of stratigraphical geology. He was of too diffident a nature to do full justice to his powers. Most of his papers were naturally technical descriptions of genera and species, but among those of wider scope may be specially mentioned his memoir on the attachment of the fossil Cephalopoda to the shell, published by the Linnean Society, and his valuable report on the Cretaceous Cephalopoda of Natal. Mr. Crick was awarded the Barlow-Jameson fund by the Geological Society in 1900, and the general appreciation of his scientific worth was equalled by the esteem in which he was held by his colleagues and all who were associated with him.

THE Herbert Spencer lecture was delivered at Oxford on October 20 by Prof. Emile Boutroux, member of the Institut and of the French Academy. The lecture, which was given in English, embodied a careful analysis of the relation between thought and action from the German and classical points of view. The contrast between the two conceptions was well brought out by the lecturer, whose treatment of the subject was, however, metaphysical rather than scientific. The modern German view was traced back to Kant, according to whom thought is conditioned in such a way that by the nature of things the present is entirely controlled by the past; hence the laws of thought are determined mechanically. The only true action is that where the effect is conditioned by the subject. From this follows the radically dualistic conception that thought and action move in two worlds which have nothing in common. But by Fichte and others it was recognised that action was only possible through the world of sense. Hegel applied to the content of action the law which Fichte had applied to its production. "The world of phenomena *creates* the world of freedom." Germany proceeded to preach that the ever-increasing control of *our* world was the only field of action. Thus action bears its own law in itself; all scientific explanation resolves itself into mechanism. Phenomena come within the sphere of action. If the Kantian conception with its implications be admitted, the attitude of modern Germany is justified. Contrast with this the truer view of antiquity, especially as brought out by Plato, viz. that thought and action are not mutually exclusive, but interdependent constituents of human life, neither being self-sufficient. With the Aristotelian τὸ καλὸν we get a living medium between action and thought; hence comes individuality and with it an indefinable enlargement of the inner life. We are free when we exercise self-control—

> Vis consili expers mole ruit suâ :
> Vim temperatam di quoque provehunt
> In maius.

CARCINOLOGISTS are indebted to Dr. J. J. Tesch, who, in *Zoologische Mededeelingen* for July, gives a long synopsis of the marsh-crabs of the genus Sesarma and allied genera, illustrated by numerous plates and text-figures. The special feature of this contribution is the key which the author has devised for the identification of the Indo-Pacific species, a task which so far has not been attempted. He also gives a brief summary of what is known of the habits of these creatures.

DR. E. C. HORT, in the Journal of the Royal Microscopical Society for August, gives a detailed account of his attempts to unravel the life-history of the meningococcus of cerebro-spinal fever, and if the statements of his results provoke criticism his investigations will have served a very useful purpose. Perhaps the most important of his results is his claim to have demonstrated the presence of excessively minute, filterable organisms which are quite as pathogenic as unfiltered cultures. In so far as prophylaxis is concerned he does not seem to have made any advance on the admirable work in this field by Lt.-Col. Gordon, summarised in these pages in April last.

IN 1886 Dr. W. E. Hoyle named a Cephalopod, taken in the Pacific by the *Challenger* Expedition in 1874, *Moschites verrucosa,* believing it to be identical with the species of that name common in the Atlantic. Mr. S. Berry, in the Proceedings of the Academy of Natural Sciences of Philadelphia, vol. lxix., part 1, negatives this decision, showing conclusively that, though closely resembling this species, it nevertheless presents so many structural peculiarities that it is entitled to rank as a distinct species, which he proposes to call *Moschites challengeri.* Mr. Berry has not examined the original specimen in the British Museum of Natural History, but he contends that photographs of the specimen which have been sent him justify his contention. He bases his decision on the form of the "hectocotylus," the distribution of the tubercles of the umbrella, and the relative lengths of the arms. This issue of the Proceedings also contains a paper by Messrs. H. A. Pilsbury and A. Brown on Oligocene fossil Mollusca from the neighbourhood of Cartagena, Colombia, wherein they describe eighteen species and two subspecies new to science. Finally, Messrs. J. Henderson and L. E. Daniels contribute a long paper, likely to interest malacologists, on hunting Mollusca in Utah and Idaho, since they record some valuable ecological observations.

WE have received from the Royal Italian Oceanographic Committee a memoir (No. xxi., 1916) by the secretary, Prof. Giovanni Magrini, setting forth its objects and giving a short account of its activities. The committee was established in 1910 for carrying out physico-chemical and biological investigations in Italian seas and for the study of the higher atmosphere. There are influential provincial sub-committees at Genoa, Naples, and Venice, which undertake work of especial importance in their respective areas, *e.g.* the Venetian sub-committee has carried out experiments with the object of developing the fisheries off the Albanian coast. The committee has, in an excellent situation at Messina, a central Institute of Marine Biology, capable of accommodating eighteen workers, besides the staff, and a motor-boat provided with the usual apparatus for plankton and other work. In addition, the committee has a well-equipped steamer 124 ft. long, with accommodation for eight technical experts and two assistants. During the years 1909–14 fourteen cruises for physico-chemical investigations were made in the Adriatic, and researches on the currents of that sea have also been carried out by means of 685 couples of drift-bottles, set free in 1912–14, 32 per cent. of which have been recovered. Six biological cruises were made during the years 1912–14 in the neighbouring seas; a list of the publications resulting from these is given. A short account is added of the Royal Italian Aerological Service.

IN the *Atti dei Lincei* (vol. xxvi., (1), p. 9) Dr. R. Perotti describes his examination of samples of bread damaged by the attacks of fungus growths which he refers to *Oospora variabilis*, Lindner. In the sample submitted every hole in the bread was carpeted over with a milk-white growth which rendered the bread unfit for food. By experimenting with cultures, the author has proved that infection takes place through the leaven, and he finds that thorough baking at a sufficiently high temperature, especially with small loaves, prevents the growth, while incomplete cooking in a cool, damp oven is favourable to development. Moreover, the leaven should be carefully prepared and stored, so as to avoid risk of infection.

FROM observations made by Dr. B. Grassi and M. Topi, under the direction of the Italian Ministry of Agriculture, and described in the *Atti dei Lincei* (vol. xxvi., (1), p. 5), it would appear that the phylloxera of the vine has undergone considerable variation, different races having developed which infect varieties of vines growing in different localities. The existence of such varieties had been previously noted by a previous writer, who proposed the name *pervastatrix* for the phylloxera attacking the vines of certain districts. In the present experiments, which date from 1914, numerous cases are described in which galls taken from one selected vine failed to infect other varieties. For example, on being infected with galls from Ventimiglia, the infection developed regularly on two varieties of vine, while on three others it completely failed to develop, and somewhat different results were obtained with galls from Arezzano.

AN account of *Hedychium coronarium* growing in the wild state in the States of Rio and Parana, Brazil, is given in *Kew Bulletin*, No. 3, by the late Mr. Clayton Beadle, whose recent death is much to be deplored. Mr. Beadle had taken great interest in Hedychium as a plant for paper-making, and his journey to Brazil was undertaken with the object of studying the growth of the plant under natural conditions. The plant grows in abundance in the low-lying lands, especially near Morretes, in Parana, the stems reaching a height of as much as 12 ft. Mr. Beadle found it was possible to make a very fair white paper from the stems growing in Brazil.

THE occurrence of boreal types in the southern hemisphere is always a matter of interest to biologists studying animal and plant distribution, and the occurrence at the Cape of Good Hope of the composite genera, Matricaria and Chrysanthemum, is worthy of note. Six species of Matricaria and five of Chrysanthemum are recorded from the Cape region by Mr. J. Hutchinson in *Kew Bulletin*, No. 3. Both genera belong to the northern regions, Matricaria having only one species in tropical Africa, while Chrysanthemum, except for the Cape species, does not occur south of the Canary Islands. The five species at the Cape are all endemic, and one of them, with fleshy stems and leaves, from Namaqualand, is here described for the first time. The Matricarias are also all endemic, with very restricted distribution.

THE annual report of the Agricultural Department, Dominica, for 1916–17 is, as usual, a document of considerable interest. Unfortunately a great deal of damage by the hurricane of August 28, 1916, is recorded, and there is a long account of the steps taken for the treatment of the storm-damaged lime trees, some photographs of which are reproduced. Reference is also made to the varietal forms of *Pimenta acris*, the bay-oil tree. As in the case of Camphor, there are two or more forms, one of which gives the valuable economic product, while the other is of little value. The Camphor tree, which has been planted in many of our English Colonies, appears to yield oil only and no solid camphor, and reference is made to this in the *Agricultural News* of June 16, 1917, and in other periodicals. Both in the case of Pimenta and Camphor it is scarcely possible to separate the two forms on morphological characters.

IN the *Annals of Botany* (vol. xxxi., No. cxxii., pp. 181–87) Dr. Spencer Pickering gives a summary of his investigations of the effect of one plant on another growing near it. These experiments originated in 1895 in his well-known observations on the effect of grass on fruit-trees. Proceeding from this complex case to the simplest conditions, conclusive evidence of toxin production in the soil by the growing plant has now been obtained. The deleterious effect of one growing plant on another appears to be a general phenomenon. By means chiefly of pot experiments the following plants have been found susceptible to such influence:—Apples, pears, plums, cherries, six kinds of forest trees, mustard, tobacco, tomatoes, barley, clover, and two varieties of grasses; whilst apple seedlings, mustard, tobacco, tomatoes, two varieties of clover, and sixteen varieties of grasses have been found capable of exercising toxic effects. In no case have negative results been obtained. The magnitude of the effect varies greatly, but the average effect in pot experiments is placed at a reduction of roughly one-half to two-thirds of the normal growth of the plants. The evidence that these detrimental effects are due to toxin production is regarded as conclusive. A plant affects its own kind just as much as any other kind, and hence it follows that the toxin formed by any individual plant will affect that individual itself. The practical bearing of these observations in various directions is discussed in the light of experimental results.

AN interesting example of the awakening of a national consciousness and political organisation among a nomadic people is recorded in *La Géographie,* vol. xxxi., No. 5. In February of this year the Lapps of northern Norway and Sweden held a conference at Trondhjem, to consider certain questions affecting their interests. More than a hundred, including several women, attended, and the conference claimed to be representative of all the Lapps in Scandinavia. The chief complaint of the Lapps, and one felt more in Norway than in Sweden, is that their grazing grounds are being steadily restricted, and they themselves frequently fined heavily for damage done to crops by their reindeer. This is merely one expression of the usual contest between nomadic and settled people whose territories adjoin. The conference resolved to press for modifications of the Norwegian law of 1883, by which penalties must be paid for damage to crops, and to demand reserves where reindeer can be pastured without interference.

THE winter of 1917 in Norway and Sweden is the subject of an article by M. Charles Rabot in *La Géographie,* vol. xxxi., No. 5. Scandinavia, like other parts of western Europe, experienced a severe winter, with temperatures considerably below the average. The most interesting part, however, of M. Rabot's article deals with the unusual ice-conditions in the Baltic in the first three months of the year, and their effect in hampering German shipping with Sweden. From the middle of January to the end of March the ports on Christiania fjord, including Christiania, were blocked with ice, and often quite inaccessible. For two months the Kattegat was full of ice, and the Sound virtually impassable; even an ice-breaker nearly came to grief. The ports of southern and central Sweden, as far as Stockholm, during all the winter months were only kept open with the help of ice-breakers. In normal winters these ports may be closed to sailing vessels, but are open to steamers. The ferry-boats from Helsingborg and Malmö to Elsinore and Copenhagen suffered frequent and long interruptions, and Oxelösund, the port for shipping Swedish iron-ore to Germany, was practically closed for two months.

IN the September number of *La Science et la Vie* Signor Funaioli, engineer of the Società Boracifera di Lardarello, gives an interesting account of the utilisation of the natural steam from the volcanic area of Tuscany, and of the manufacture of boric acid and borax. The highly saturated steam issues from the ground often at fairly high pressures, but for purposes of conversion it is utilised for heating a series of tubes containing water, the steam pressure in these tubes being two atmospheres (say 30 lb. per sq. in.). The steam drives low-pressure turbines, which in turn are coupled to alternators. The steam and water of these "soffioni," as they are termed in the vernacular, contain quantities of boric acid, which is concentrated in a special apparatus and gives a product of about 99 per cent. purity. The acid, treated with sodium carbonate, gives borax, which is manufactured in the form of crystals and powder. Ammonium carbonate is also manufactured, the carbonic acid necessary for the process being also derived from the "soffioni." Prof. Nasini, the chemist in charge of the research department of the establishment, is now carrying out investigations on the radio-activity of the gases of the "soffioni," and on the separation of the helium, which is another element present.

REPORTS have lately been current with regard to a method of making ships "invisible" which is attributed to Mr. Edison. The method is said to consist of a kind of "camouflage," which makes a vessel "absolutely invisible at a short distance." The idea is not new, though possibly some new device may have made its application more successful. The difficulty as regards submarines lies in the fact that to a submarine periscope every vessel is seen against the sky, and usually "hull down." A vessel disguised by camouflage may therefore be "invisible" against a background of water, and yet very obvious to a submarine observer, who sees it against a varying sky. Much can, no doubt, be done to deceive the submarine as to the course of the vessel by suitably "breaking up" its outline, and this seriously affects the aim of a torpedo. But the problem of naval camouflage remains quite different from similar problems on land, where a definite background can be counted upon.

MESSRS. ARNOLD AND READ showed in 1914 that two carbides, Fe_3C and WC, are probably present in tungsten steels. Messrs. Kotaro Honda and Murakami conclude, in a research just published, that these can exist either as a double carbide or as two carbides in magnet steels according to the heat treatment. If the steel is heated to from 800°–900° C., and then slowly cooled, a double carbide is formed. Above Ac_1 this decomposes into its components, but both remain dissolved in the austenite. On heating still further, the tungsten carbide begins to dissociate into tungsten and carbon, and the dissociation is complete at about 1100° C. On cooling the steel from above this temperature, Ar_3 begins at about 550° C., and Ar_1 at 500° C. On reheating to 900° C the double carbide is once more formed. Magnet steels cooled from 900° C. deposit granular ferrite and eutectoid. If, however, they are cooled from above 1100° C. the ferrite is needle-shaped. The granular ferrite is regarded by the authors as pure iron, while the needle-shaped ferrite is a solid solution of tungsten in iron. These conclusions agree with those drawn from the magnetic experiments. Some specimens exhibiting the Ar_1 change, partly at 700° C. and partly at 500° C., have both granular and needle-shaped ferrite. In some of the above conclusions the authors merely confirm well-established work done in England and France several years ago.

THE Journal of the Department of Agriculture and Technical Instruction for Ireland (vol. xvii., No. 4) contains the report of a lecture entitled "Chemistry in Industry," delivered by Prof. G. T. Morgan to a gathering of teachers. Perhaps even yet the general public does not realise the fundamental importance of the application of chemistry to industry. If so, Prof. Morgan's answer to the question: What part does chemistry play in satisfying the two primary wants of mankind, food and shelter? may perhaps serve to make the whole subject more "understanded of the people." He points out that scientific agriculture is absolutely essential in food production, and that the exhaustion of soils following intensive cultivation must be made good by artificial fertilisers. The methods of preparing calcium nitrate used in Norway and that of Kilburn Scott are described, and stress is laid on the necessity of burning coal in a rational manner so as to recover all the ammonia and other by-products. The production of superphosphate by the use of nitre-cake and the recovery of potash from the flue-dust of cement kilns are mentioned. As regards the provision of shelter, Prof. Morgan points out that in the production of Portland cement the chemist is supreme, and very few stable structures are built nowadays in which it is not employed. Glass is another important material in building construction of which the manufacturer requires the continual intervention of the chemist. Chemistry is no less important in industries providing the munitions of war. As the raw materials for the latter are obtained from coal-tar, which also supplies the organic compounds necessary for the production of dyes and drugs, the latter industries become interdependent with that of munition-making. The synthesis of one dye or drug is not only important *per se,* but also frequently the incentive in the synthesis of others. Thus, since the synthetic production of indigo many other vat dyes not found naturally have been produced.

WITH reference to our note on ferro-concrete ships (NATURE, October 11, p. 114), *Engineering* for October 19 contains an interesting account of the launch of the ferro-concrete ship *Beton I.,* with illustrations from photographs. As indicated in our former note, the ship was built bottom upwards and launched in this position. On taking the water, the air contained in the structure caused the draught to be comparatively small, the water plane was therefore large, and the vessel was in stable equilibrium. On permitting some of the air to escape, the vessel sank in the water; owing to the shape of the bottom, the area of the water plane was thus reduced considerably. Ultimately a draught was reached in which the centre of gravity was above the centre of buoyancy, and an upsetting couple was established which caused the ship to turn right side upwards, in which position stable equilibrium was again attained. The uprighting, to begin with, proceeded slowly, and accelerated in the intermediate stages in which the couple was greatest, and then again more slowly. The turning took place very neatly, without any shock, and the vessel had then, of course, to be emptied of water.

AMONG the forthcoming books of Mr. Humphrey Milford, of the Oxford University Press, are the following:—"Agriculture in Berkshire," J. Orr (a survey made on behalf of the Institute in Agricultural Economic, University of Oxford), illustrated; "A Weather Calendar," Mrs. H. Head, with a bibliography; "Dr. John Radcliffe, his Fellows and Foundations," J. B. Nias; "Dynamic Psychology," R. S. Woodworth (The Jesup Lectures); "Aristotle: Meteorology," edited by F. H. Fobes; "The Principles of Acidosis and Clinical Method for its Study," A. W. Sellards; "The Self and Nature," De Witt H. Parker; "The Problem of Space in Jewish Mediæval Philosophy," I. Efros.

THE new announcements of Messrs. Longmans and Co. include:—"Rhododendrons and their Hybrids," by J. G. Millais, with coloured plates by A. Thorburn, B. Parsons, E. F. Brennand, and W. Walker; "Mysticism and Logic and other Essays," by the Hon. B. Russell; "Reality and Truth: a Critical and Constructive Essay concerning Knowledge, Certainty, and Truth," by the Rev. Prof. J. G. Vance; and "The Works Manager To-day," by S. Webb.

MESSRS. J. M. DENT AND SONS, LTD., will shortly publish in "Everyman's Library" an anthology from the works of the late Prof. William James, which will form an introduction to the writings of the philosopher. The book is edited by Prof. C. Bakewell, of Harvard University.

OUR ASTRONOMICAL COLUMN.

THE HUNTER'S MOON.—The following particulars as to the visibility of the moon during the next fourteen days may be of interest:—

Rises		Souths		Sets		Altitude on meridian
	P.M.		P.M.		A.M.	°
Oct. 25,	2.26	Oct. 25,	7.52	Oct. 26,	1.32	31
26,	2.45	20,	8.43	27,	2.57	37
27,	3. 5	27,	9.35	28,	4.22	44
28,	3.26	28,	10.28	29,	5.47	50
29,	3.49	29,	11.22	30,	7.13	55
			A.M.			
30,	4.19	31,	0.19	31,	8.34	59
31,	4.56	Nov. 1,	1.17	Nov. 1,	9.49	62
Nov. 1,	5.41	2,	2.15	2,	10.50	63
2,	6.38	3,	3.11	3,	11.39	62
					P.M.	
3,	7.42	4,	4. 4	4,	0.16	60
4,	8.49	5,	4.53	5,	0.43	58
5,	9.59	6,	5.39	6,	1. 4	54
6,	11. 8	7,	6.23	7,	1.23	50
	A.M.					
8,	0.15	8,	7. 4	8,	1.39	45

The times along the same horizontal line refer to the same appearance of the moon above the horizon.

Full moon occurs at 6.19 a.m. on October 30, and last quarter on Nov. 6 at 5.4 p.m. It may be noted that the half-moon gives only about one-tenth of the amount of light given by the full moon at the same altitude.

THE ORBIT OF COMET 1914*c*.—A definitive investigation of the orbit of comet 1914*c* (Neujmin) has been made by J. Svärdson (*Ast. Iaktt. Stockholms Obs.,* Band 10, No. 6). The comet was never very bright, but was observed during a period of 182 days, from June 27 to December 22. Corrections have been applied for the perturbations due to Jupiter, and it is concluded that the observations are best satisfied by the following hyperbolic elements:—

$$T = 1914\text{, July } 30{\cdot}15783 \pm 0{\cdot}13374 \text{ Berlin M.T.}$$

$$\left.\begin{array}{l} \omega = 14^\circ \ \ 2' \ 12{\cdot}5'' \pm 92{\cdot}4'' \\ \Omega = 270^\circ \ 18' \ 26{\cdot}7'' \pm \ 3{\cdot}3'' \\ i = 71^\circ \ \ 2' \ 18{\cdot}4'' \pm 10{\cdot}1'' \end{array}\right\} 1914{\cdot}0$$

$$\log q = 3{\cdot}747131 \pm 0{\cdot}000243$$

$$e = 1{\cdot}003672 \pm 0{\cdot}000296$$

The orbit is remarkable for the exceptional value of the perihelion distance; in this and other respects it shows considerable resemblance to the orbit of the comet of 1729.

MAXIMUM OF MIRA CETI.—This well-known variable star may be expected to reach a maximum about the end of the current month. The magnitude ranges from 2·0 to 9·6 in a period of about 331 days, but the period and magnitude at maximum are subject to variation. The star is now well placed for observation, crossing the meridian near midnight, and thus being above the horizon for practically the whole night. On October 20 the star was of about 4th magnitude.

BRESTER'S THEORY OF THE SUN.—In anticipation of a further volume on the constitution of the sun, Dr. A. Brester has issued the introduction and general conclusions in pamphlet form (La Haye: P. van Stockum et Fils, 1917). As is well known, Dr. Brester does not accept the general view that the surface of the sun is subject to violent disturbances, and seeks to explain solar phenomena on the basis of a relatively tranquil gaseous globe which is practically undisturbed by convection currents. The solar gases decrease in density and luminosity from the centre outwards, but on account of their opacity their light never reaches us. The photosphere is a condensation stratum which is rendered luminous in the same way as a mantle in an ordinary gas flame, while a sun-spot is a perforation